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• ValueNetworks.com

Value Analysis of the Impact of EU R&D projects Value Networks and Intellectual Capital Formation

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Sigal Shachar, Edna Pasher Associates Dimitris Tektonidis, Altec Mimi Tresman, Edna Pasher Associates Apostolos Vontas, Altec

"Effectiveness of ICT RTD Impacts on the EU Innovation System"

Final Report: www.vernaallee.com/value_networks/EU-final_report.pdf Annexes to Final Report: www.vernaallee.com/value_networks/EU-annexes.pdf







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By assuming or creating *roles* ...

to *convert* tangible and intangible assets into *deliverables* ...

that can be conveyed to other roles through the execution of a transaction.

In turn, value is *realized* by companies when they convert inputs into gains.



Value Conversion Strategy

Allee, Journal of Intellectual Capital, January 2008

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The emergent purpose of the value network is revealed through the pattern of **roles** and **value exchanges** that support an economic or social goal or output.

Sustainability depends on a consistent high level of *both* transactional and network *perceived value*.



Value Creating Network

Allee, Journal of Intellectual Capital, January 2008

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European Innovation Networks





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2007 Evaluation of ICT-RTD Research Networks funded by the European Commission

- Linking value networks patterns to Intellectual Capital formation and macro economic analysis at the Regional level
- Linking value networks patterns to Intangible Asset formation at organizational and inter-organizational levels



Intellectual Capital Formation



Organizational and Inter-Organizational Value Networks



Regional Innovation Systems





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- National and industry perspectives on innovation were enriched in early 1990s by development of Regional Innovation Systems (RIS) concept. (Cooke et al)
- Coincided with industry cluster concept promoted by Michael Porter et al.
- Both concepts emphasize relationships but RIS is closer to view of RIS as complex adaptive system or network.

Big Question:

How to link innovation to economic outcomes?

In late 1990s, idea of **intellectual capital** expanded from a corporate perspective to a national and regional perspective (Edvisson, Pulic et al).







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- The EU funds billions annually for research studies to foster innovation and cross-boundary research, and to increase deployment and diffusion of resulting innovations.
- An evaluation was performed to assess how effectively EU ICT RTD and deployment initiatives are being exploited in European systems of innovation at member state and regional levels.

Innovation systems were addressed in their broadest sense as the interplay of institutional, research and market innovation actors.



Goals for the 2007 Evaluation





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- To understand the effectiveness of collaboration networks, including those supported by ICT RTD and deployment programmes, in facilitating knowledge flows and transfers across regions and sectors.
- To identify where and how the links between ICT RTD, technology diffusion and systems of innovation can be strengthened at EU, member state, and regional levels.
- To target where and how to strengthen the leverage of EU ICT RTD and deployment initiatives in terms of structural funds activities, co-ordinated public procurement, and private sector RTD.







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- where and how regional innovation systems are reinforced by EU, member state, and regional initiatives;
- > how regions can use ICT programmes as **tool for growth**;
- how the ICT programme structures the innovation system;
- what tacit-knowledge skills and capabilities organisations acquire through numerous participations in projects;
- what policy changes can be made to better reflect the needs of the innovation systems at the regional level;
- what opportunities exist to increase or sharpen impact of ICT programmes on innovation systems at regional level.







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- From a systemic point of view, the processes involved in generating innovation at EU level are nonlinear and networked with multiple feedback loops.
- IST-RTD is a complex, self-organising network of organisations.
- Collaboration in EU Framework Programmes is dominated by key 'Knowledge Hubs' (at Global, Member State, and Regional levels) that are mainly responsible in generating and diffusing scientific and technological knowledge.

Impact must be assessed in intangible terms – not just economically.



Three Levels – Four flows





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Intellectual Capital Indicators





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Indicator	Category Intellectual Capital	
Human resources in Science and Technology (% of population)	Human Capital	
Participation in Life-Long Learning (per 100 population aged 25-64)	Process Capital	
EPO Patents per million population	Process Capital	
Employment in Medium-High and High-Tech Manufacturing (% of total workforce)	Market Capital	
Employment in High-Tech Services (% of total workforce)	Market Capital	
Public R&D expenditures (% of GDP)	Renewal and Development	
Business R&D expenditures (% of GDP)	Renewal and Development	
Unemployment (% of total population	Financial Capital	
GDP per Capital	Financial Capital	

Developed by Edna Pasher, Modeled after Skandia Navigator

Edvinsson, L. and Malone, M.S. (1997), *Intellectual Capital: Realizing Your Company's True Value by Finding its Hidden Brainpower*, Harper Business, New York, NY.



Sample of Ten Regions

- 10 regions population greater than 400,000 but density lower than 1,000 people per square kilometre
- Similar macro-economic characteristics i.e. per capita GDP, Public sector RTD investment and Enterprise RTD investment
- > Differ in level of participation in Framework Programmes



Pairing No.	Regions	FP6 Participations
1.	De91 – Braunschweig (Germany)	54
	Ukj4 – Kent (UK)	3
2.	Gr43 – Crete (Greece)	64
	Se09 – Smaaland (Sweden)	8
3.	Be24 – Flanders (Belgium)	177
	Fr72 – Auvergne (France)	7
4.	Cz06 – Jihovýchod (Czech Republic)	14
	Itc3 – Liguria (Italy)	3
5.	Es21 – Pais Vasco (Spain)	97
	Pl61 – Kujawsko-Pomorskie (Poland)	3







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- Most innovative are Flanders, Braunschweig, Kent, and the benchmark, Israel. High participation in EU ICT projects and highly skilled labour, a high number patents, and a medium/high rate of public and business R&D expenditure. They are also strong in SMEs and/or high tech industries.
- Less innovative regions are Kujawsko-Pomorskie and Jihov'ychod, both with low number of patents, low rate of public and business R&D expenditure, etc.
- However, lowest performing regions either do not have institutional support for innovation or are heavily weighted with slow growing traditional industries, therefore their participation in EU ICT project is also low.
- Smaaland and Auvergne have similar medium performance data; though both of them are considered relatively innovative. However they have a very low rate of participation in EU ICT projects. In these regions there is low awareness and a lack of regional policy encouraging participation in this kind of projects.
- Pais Vasco, Liguria, and Crete all medium to low performers do have institutional strategies or support for innovation or entrepreneurship.







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- Innovation capacity is systematically tracked and monitored utilizing economic, social, and where available, Intellectual Capital, indicators.
- A clear regional government innovation strategy (systems of incentives and innovation funds, etc.) integrated with national-and European-level policies.
- Regional institutions have established science parks, 'virtual districts,' or 'technology incubators' involving universities, research centres, and private industry to diffuse new ideas in the local context.
- An institutional framework, incentives, or regional body encouraging participation in European ICT RTD and deployment, especially 'first timers'.
- Most critical socio-cultural and structural factors for innovation are addressed at the regional policy level.
- Benefits of participation in EU ICT RTD and deployment activities are tracked and made visible at the levels of organisations, networks, and clusters.
- Regional innovation networks, roles, and actors have been identified and are targeted for support and development.
- Policy and institutional frameworks include incentives for intraregional collaboration networks and local take-up of ICT resulting from EU RTD.





Innovation Value Network Archetypes of Phase Changes

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Value Network "Archetypes"



Edna Mana Sultan Sultan

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Importance of the Archetypes





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The value network archetypes are important for two reasons:

- Each archetype generates a Value Network Intellectual Capital Profile based on its typical deliverables and beneficiaries.
- 2. The four value network archetypes each support a particular **stage of innovation** from conception to implementation in the form of commercialization or production.

It can be assumed that in regions where participation in any particular value network archetype is high then there would be a corresponding high performance in generation of Intellectual Capital at both the organizational and the regional levels relating to typical project deliverables.



Distribution of Archetypes





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Value Network Analysis	All 10 Sample Regions
Total number of value network archetypes served (Max: 4)	3
Number of projects supporting archetype: Research	180
Percentage of projects supporting archetype: Research	69.77
Number of projects supporting archetype: Community Building	60
Percentage of projects supporting archetype: Community Building	23.26
Number of projects supporting archetype: Market Validation	18
Percentage of projects supporting archetype: Market Validation	6.98
Number of projects supporting archetype: Commercialization	0
Percentage of projects supporting archetype: Commercialization	0.00



Research Value Network





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Research Value Network Archetype

Pattern of Anticipated IC Creation based on actual deliverables





Community Building Network





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Community Building Value Network Archetype

Pattern of Anticipated IC Creation based on actual deliverables







Market Validation Network





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Market Validation Value Network Archetype

Pattern of Anticipated IC Creation based on actual deliverables







Commercialization Network





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Commercialization Value Network Archetype



Pattern of Anticipated IC Creation based on actual deliverables

Commercialization

The 10 sample regions did not have a Commercialization Value Network.



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"Gatekeeper" Role is played by Vaxjo University as the only point of connection between two larger project networks.







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- The 2007 EU evaluation demonstrates that research program interactions can be fruitfully represented as value networks, operating both at European and national/regional levels.
- Regional performance in terms of value created from FP6 project participations depends on the projects being used to improve value network patterns of knowledge sharing, cooperation, and connectivity within a region, in addition to benefitting organisations taking part in the project.
- Value network patterns link to specific value conversion activities and Intellectual Capital formation for project partners, as well as to the innovation capacity of the region as a whole.







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- Value Network Analysis (VNA) provides a possible solution to one of the most challenging business issues in the intangibles economy: describing and monitoring the role of intangibles in value creation.
- In government, civil society, and nonprofit organizations value impacts are exceedingly difficult to describe in only tangible or financial terms.
- VNA offers a scalable method for understanding the dynamics of intangibles and value creation at the organizational, interorganizational, and regional level.







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Webcrawl Skane 50





Skane50

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Oolu Region Finnland





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Competition

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